

Occupational Health and Safety in the Brazilian Sector of Cargo Transportation: A Systematic Review on the Category of Self-Employed Drivers



R. Soliani and L. Bueno 

Abstract Objective: To analyze the main aspects of Occupational Health and Safety that affect the category of self-employed drivers. Background: Self-employed drivers in Brazil are not covered by Labor Laws to protect them against strenuous days of work. Method: Our exploratory method intends to bring up the problem and present hypotheses. It is a Systematic Literature Review, in which a structured process was used, including planning, execution and analysis of the researched data. Results: Sleep-deprived driving or signs of fatigue is one of the main risk factors for accidents in the world. Among truck drivers it is very common to use chemical substances to reduce sleep and decrease tiredness. Conclusion: The findings corroborate with the discussions brought about the increasing informality of work in the self-employed category. Long working hours, the absence of rest breaks, the risk of robberies and accidents affect the health of drivers. Application: To add the category of self-employed drivers in Labor Laws thus reducing the main cause of traffic accidents and meet a minimum working condition.

Keywords Safety · Health · Working conditions self-employed · Truck driver

1 Introduction

Brazil is the country that has the highest concentration of road transportation in the main world economies (Wolff and Caldas 2018), accounting for about 61% of cargo and 95% of passenger in the country (CNT 2019). This scenario shows the importance of the category of truck drivers for the country, affecting the county's economy and politics. The national government estimates that the stoppage of truck

R. Soliani
Federal Institute of Acre (IFAC), Rio Branco, Brazil
e-mail: rodrigo.soliani@ifac.edu.br

L. Bueno (✉)
Federal University of Paraíba (UFPB), João Pessoa, Brazil
e-mail: bueno@ct.ufpb.br

© The Author(s), under exclusive license to Springer Nature Switzerland AG 2022
P. M. Arezes et al. (eds.), *Occupational and Environmental Safety and Health III*,
Studies in Systems, Decision and Control 406,
https://doi.org/10.1007/978-3-030-89617-1_54

613

drivers in 2018 had a negative impact on the economy of about R\$ 15.9 billion, approximately 0.2% of GDP (Brazil 2018).

Occupational Health and Safety (OHS) concerns about the cargo transportation sector include risks of road accidents, physical risks, violence, dangerous operational situations and exposure to harmful substances (Hege et al. 2016). Drivers are in a unique situation, as OHS sees the transportation sector can have a direct impact on third parties, such as road users, urban traffic and public safety (Crizzle et al. 2017). According to data from the National Transportation Confederation (CNT 2019), considering all accidents recorded on the Brazilian federal highways between the years 2007 and 2018, 570,029 accidents involving at least one truck were recorded.

Several studies present fatigue, drowsiness, physical and mental fatigue, drug use and payment for production among the main factors that lead to occupational accidents with professional drivers (Sinagawa et al. 2014; Gonçalves et al. 2015; Junior et al. 2015, 2016; Nazari et al. 2017; Junior and Garcia 2019).

Road freight transportation has different models of freight contracting, a factor that negatively impacts the working conditions offered to drivers. The working hours of truck drivers in Brazil are, as a rule, linked to the labor relationship of the driver with the carrier responsible for transporting the cargo (Junior and Garcia 2019). Self-employed drivers are individuals and owners, co-owners or tenants of one to three trucks. They can be hired directly by the applicant for the transportation service or provide services to a carrier, which is the most common form of action for the self-employed (Silva et al. 2016).

The job of a truck driver is one of the most demanding in relation to the need to have good physical and mental conditions. Exhaustive journeys cause truck drivers to reverse their sleep cycle, and this inversion results in an excessive physical, cognitive and psychic burden (Narciso and Mello 2017). The difference between employed drivers and self-employed drivers may include: negotiating debts, managing finances, attracting new services or ensuring regular transportation. The group of self-employed drivers is under greater pressure at work, as they themselves need to be responsible for issues outside the driving. The demand for cargo, the payment of tolls, the lack of resources to replace the cargo in the event of an assault, are among the possible sources of stress for this group of professionals (Wanke 2012).

The Brazilian road freight transport sector needs urgent attention. This study aims to identify and analyze, through a literature review, the main aspects of occupational health and safety related to the category of self-employed drivers.

2 Materials and Methods

The methodology adopted for the development of this study, according to Gil (2019), is qualitative in its approach to the problem, since it has a dynamic relationship between the real world and the subject, through interpretation without numerical representation; for its purpose, it is exploratory, since it intends to familiarize itself with the problem and present hypotheses; and by technical procedures, it is a Sys-

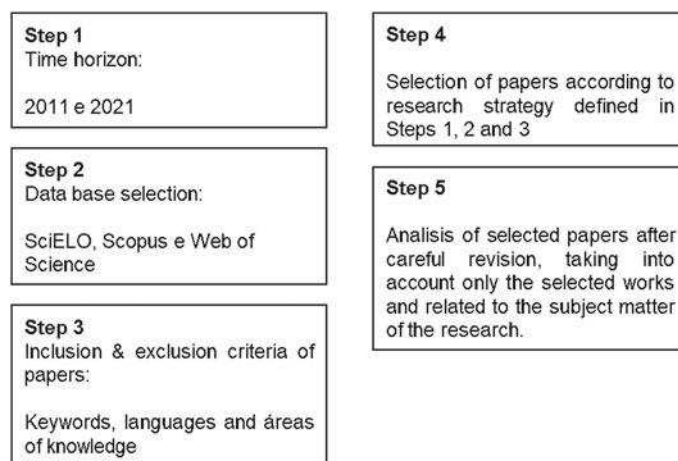


Fig. 1 Methodology for systematic literature review. (Soni and Kodali 2011; Saenz and Koufteros 2015)

tematic Literature Review, in which a structured review process was used, including planning, execution and analysis of the researched data (Saenz and Koufteros 2015). Figure 1 presents the set of five steps (Soni and Kodali 2011; Saenz and Koufteros 2015) that allow the verification and replicability of the procedures adopted and the conclusions obtained by the researcher.

We used SciELO, Scopus and Web of Science databases to collect articles, and for the search for articles aligned with the proposed theme, we adopted the following keywords: “Safety” or “Health” or “Truck Driver”; “Occupational Risks” or “Occupational Health” or “Professional Driver”; “Working Conditions” or “Self-employed” or “Truck Driver”. These words were used in all databases, in English and Portuguese, in the areas of knowledge of Engineering, Health, Administration, and the articles should have in the title, abstract or throughout the text, any of the keywords- key used. We used only articles published within the past ten years, in full text. Through the pre-selected documents, other approaches were sought in the bibliographic references in order to insert them in the research. After this survey, the research sought to relate the information available and their contributions to the discussion on the main aspects of the working conditions of self-employed drivers in road freight transportation.

3 Results and Discussion

Based on the systematic literature review carried out, a total of 43 articles were obtained. Applying the exclusion criteria (area of knowledge, language, period of publication and complete format for analysis), 20 articles were selected for the study, presented in Fig. 2.

	Main Results
Araújo, Bandeira & Campos, 2014.	It was determined the value of the final freight price that would be enough to remunerate all the expenses.
Cerqueira-Santos & Santana, 2014.	It was identified that the informality and precariousness present in this profession, configured by outsourcing, compromise the working conditions and health of drivers.
Coelho, 2015.	It was concluded that limits should be imposed on collective agreements, aiming to maintain the objectives of the law and improve the working conditions of the driver.
Crizzle et al., 2017.	The findings show that long-haul truck drivers have multiple risk factors that can lead to various medical conditions.
Di Milia et al., 2011.	The findings show that fatigue has been implicated in a range of impairments.
Fonseca, 2016.	The findings show that professional drivers and professional soccer athletes suffered precariousness of labor rights by special legislation.
Gonçalves et al., 2015.	This research demonstrates that drowsy driving is a major safety hazard throughout Europe.
Hege et al., 2016.	It was identified that there has been a lack of comprehensive and integrated safety and health attempts to the health and safety of truck drivers.
Junior et al., 2016.	It was noted that the combined use of drugs exposes drivers at risk of accidents, problems with laws and spread of diseases.
Junior & Garcia, 2019.	The findings show that it is necessary to increase the number of inspections and in addressing the contributing factors for fatal work accidents among truck drivers.
Lan et al., 2020.	Work-related transmission is considerable in early Covid-19 outbreaks, and the elevated risk of infection was not limited to healthcare workers.
Malinga et al., 2021.	This review highlights the countries response to mitigate the impact of the pandemic by implementing measures to facilitate safe cross-border trade.
Narciso & Mello, 2017.	To restrict and reduce accidents, deaths, and injuries in traffic, appropriate legislation is essential, aiming at the safety of workers and users of highways.
Nazari; Moradi & Rahmani, 2017.	Results showed various interventions in different parts of the world have been used to decrease drowsy driving.
Oliveira & Carlotto, 2020.	The study results reveal a risk profile consisting of occupational, psychosocial and occupational stressors variables in truck drivers.
Santos et al., 2020.	As the pandemic is still evolving, workers must be a priority target of attention in the control and spread of the disease.
Silva et al., 2016.	Both contractors and self-employed drivers mentioned the precarious labor relations and short delivery timeframes were related to use of drugs.
Sinagawa et al., 2014.	Truck drivers who reported driving more than 270 km had higher frequencies of urine samples positive for amphetamine than those who reported shorter driving distances.
Wank, 2012.	The results point to three large groups of shippers, in which the perceived quality of service depends on the intensive use of self-employed workers.
Wolff, Caldas, 2018.	The model proposed includes ten variables that count from the initial investment in the road to air emissions of carbon dioxide.

Fig. 2 List of articles selected for the study (Authors 2021)

Self-employed drivers are characterized by owning their own truck and working on their own, establishing their own working hours. They do not receive the same benefits as registered workers, such as vacation, 13th salary, among others. Therefore, they have no bond or guarantee of rights under the terms of the Brazilian labor law known as Consolidation of Labor Laws (CLT), which comprises Self-Employed Cargo Carriers, being subcontracted by the carriers and remunerated for the number of trips they take (Brazil 2007).

It should be noted that, even for the employed drivers, governed by the CLT, through Law 13.103/2015, there is a certain doctrinal discussion about the constitutionality of the devices that govern this category, since the said law has made rights considered essential for work safety. In this sense, the aforementioned law foresaw that the waiting time (loading/unloading or inspection of the goods) is not considered working time, even though it is necessary for the driver to remain in the place in the employer's interest (Coelho 2015).

The discrepancy in rights between the driver and among the other employees governed by the CLT is evident, and the overlap between the economic interest of the employer and that of the employees becomes clear. In the case of the self-employed driver, the exploitation of the category is even greater, as there is no legal minimum for this category (Fonseca 2016).

A current example of the precarious working conditions of the self-employed is the exposure of these workers to the risks of contagion from COVID-19, since this category of drivers has personal habits, such as bathing, eating and staying overnight, which are carried out in shared environments and in locations in varied regions in a short period of time (Malinga et al. 2021).

Lan et al. (2020) conducted a study on the impact of the pandemic on different professional categories, carried out in six Asian countries, identifying that the five occupational groups with the highest frequency of cases were health workers (22%), drivers and transport workers (18%), service sector workers (18%), cleaning professionals and domestic workers (9%), and public security employees (7%). In Brazil, the data available on the notification of cases among groups of workers are still incipient and have significant underreporting (Santos et al. 2020).

Many carriers choose to hire self-employed truck drivers to transport their cargos, thus reducing their operating costs (vehicle maintenance, fuel and other related expenses), as well as responsibilities and commitments to employment relationships (Wanke 2012). These drivers accept inadequate working conditions, such as long working hours, face great difficulty to change vehicles, carry out regular maintenance or meet safety standards. The low freight rates in the Brazilian market are the result of the excessive offer of transport services offered by self-employed drivers, which are mostly contracted by large carriers. Well-being itself becomes a secondary concern, since fuel costs represent a much larger part of freight than of your own profit obtained from the trip (Araújo et al. 2014).

The study by Cerqueira-Santos and Santana (2014), when analyzing the perception of satisfaction with the work of 342 truck drivers, self-employed and employees, from several states in Brazil, showed that drivers who had an employment relationship indicated greater satisfaction with the job when compared to freelancers. Silva et al. (2016) state that among the self-employed drivers studied, recurrent reports were observed about anxiety and constant concern in relation to meeting the deadlines set by the company and to be able to make new trips, due to their monthly income depending exclusively on the number of commissioned transported loads. In addition, self-employed drivers mentioned discontent in relation to their working conditions, such as helplessness, insecure wages and labor rights (such as time off and health care).

Fatigue and drowsiness are considered a major OHS problem in the transport sector, not only because they affect the well-being of drivers, but also because they negatively impact performance when driving the vehicle and, consequently, on safety (Oliveira and Carlotto 2020). Fatigue and drowsiness can occur due to several endogenous and exogenous factors, such as sleep disorders, poor physical and mental health, old age, long working hours, poor diet, alcohol and illicit drug use or habits that are harmful to health, as poor sleep quality; long driving periods, with times that conflict with the organism's natural rhythms; monotony; permanent night shifts and excess overtime (Di Milia et al. 2011).

Sleep-deprived driving is one of the main risk factors for accidents, accounting for between 20% and 30% of all traffic accidents in the world (Nazari et al. 2017). A study carried out in 19 European countries identified that 17% of the interviewed drivers had ever slept at the wheel in the past two years, and the most frequent reasons they pointed out were poor sleep the night before (42.5%) and inadequate sleep habits in general (34.1%) (Gonçalves et al. 2015).

Among Brazilian truck drivers, it is very common to use chemical substances to reduce sleep and reduce tiredness, as a result of lack of sleep and little time for rest, due to the long journeys made to meet deadlines and delivery times. In the study by Junior et al. (2016), it was identified among the 114 drivers interviewed, 64% use alcohol and 25.8% used drugs. Stimulants are the drug most consumed by 87.5%, followed by 75% of cocaine and 62.5% of crack. Of these, 55.6% use drugs in combination, 50% consume alcohol on the roads and 45% have already driven after drinking.

Long working hours, absence of rest breaks, poor diet, risk of robberies and accidents at work affect the health of self-employed drivers. In addition, the short delivery times not only make it difficult to take rest breaks, but also push many workers towards the consumption of chemical substances, such as amphetamines and alcohol, since they need to stay awake to meet the urgencies of the deadlines set by the companies (Sinagawa et al. 2014).

4 Conclusions

Based on this systematic literature review, it is observed that the road cargo transportation sector in Brazil, as well as in other countries, uses the hiring of self-employed drivers as a way to reduce costs and avoid the existence of costly labor relations. The lack of labor rights adds to the transfer of operating costs (fuel, tires, maintenance, etc.), so, in addition to not having a fixed income, drivers have to cover the costs inherent in the transportation activity, compromising their safety.

Sleep-deprived driving or signs of fatigue is one of the main risk factors for accidents in the world. Among Brazilian truck drivers, it is very common to use chemical substances to reduce sleep and decrease tiredness. Long working hours, the absence of rest breaks, the risk of robberies and accidents at work affect the health of self-employed drivers.

Depending on the above, the lack of legal regulation stipulating minimum safety conditions for self-employed drivers, compromises the health of both drivers and population. Self-employed workers do not have the protections provided for in the CLT, such as working hours, benefits and vacation, as employed drivers have.

Truck drivers are an important category of workers for the economy of many countries, especially for Brazil, which handles a large part of its cargo movements through roads. However, the working conditions to which these professionals are subjected, especially the self-employed, do not reflect this highlight. The improvement of the driver's working conditions is of interest not only to the category, but to the whole of society.

References

- Araújo, M.P.S., Bandeira, R.A.M., Campos, V.B.G.: Custos e fretes praticados no transporte rodoviário de cargas: uma análise comparativa entre autônomos e empresas. *J. Transp. Lit.* (2014). <https://doi.org/10.1590/2238-1031.jtl.v8n4a8>
- Brazil: Lei nº 11.442, de 5 de janeiro de 2007. Casa Civil (2007)
- Brazil: Greve dos caminhoneiros impacta a economia em cerca de R\$ 15,9 bilhões. Secretaria Especial de Fazenda (2018)
- Cerqueira-Santos, E., Santana, M.: Work satisfaction among truck drivers: a comparative study of self-employed and employees. *Revista de Psicologia da UFC* (2014). <https://doi.org/10.17652/rpot/2016.2.675>
- CNT: Pesquisa CNT de Rodovias 2019. Confederação Nacional do Transporte (2019)
- Coelho, L.A.T.: As Leis 12.619/2012 e 13.103/2015 e flexibilização da jornada de trabalho do motorista em transporte rodoviário de passageiros e de cargas. *Revista eletrônica [do] Tribunal Regional do Trabalho da 9 Região* (2015)
- Crizzle, A.M., Bigelow, P., Adams, D., Gooderham, S., Myers, A.M., Thiffault, P.: Health and wellness of long-haul truck and bus drivers: a systematic literature review and directions for future research. *J. Transp. Health* (2017). <https://doi.org/10.1016/j.jth.2017.05.359>
- Di Milia, L., Smolensky, M.H., Costa, G., Howarth, H.D., Ohayon, M.M., Philip, P.: Demographic factors, fatigue, and driving accidents: an examination of the published literature. *Accid. Anal. Prev.* (2011). <https://doi.org/10.1016/j.aap.2009.12.018>
- Fonseca, E.P.R.: Motoristas profissionais e atletas profissionais de futebol: quando a legislação especial precariza o trabalho. *Revista do Curso de Direito da UNIFOR* (2016)
- Gil, A.C.: Métodos e Técnicas de Pesquisa Social. Editora Atlas, 7 edição (2019)
- Gonçalves, M., Amici, R., Lucas, R., Akerstedt, T., Cirignotta, F., Horne, J., Léger, D., McNicholas, W.T., Partinen, M., Téran-Santos, J., Peigneux, P.: Sleepiness at the wheel across Europe: a survey of 19 countries. *J. Sleep Res.* (2015). <https://doi.org/10.1111/jsr.12267>
- Hege, A., Perko, M., Apostolopoulos, Y., Sönmez, S., Strack, R.: US long-haul truck driver health demands integrated approach. *Int. J. Workplace Health Manag.* (2016). <https://doi.org/10.1108/ijwhm-12-2014-0058>
- Junior, A.F., Garcia, E.G.: Road freight transport: fatal work accidents and labor inspection. *Revista Brasileira de Saúde Ocupacional* (2019). <https://doi.org/10.1590/2317-6369000018317>
- Junior, G.A., Melo, H.C.S., Mendes, D.F., Silva, M.L.A., Oliveira, R.F.S., Gaya, C.M.: O uso de drogas por motoristas caminhoneiros e o comportamento de risco nas estradas. *Revista de Epidemiologia e Controle de Infecção* (2016). <https://doi.org/10.17058/reci.v6i4.7968>
- Lan, F.Y., Wei, C.F., Hsu, Y.T., Christiani, D.C., Kales, S.N.: Work-related Covid-19 transmission. *medRxiv* (2020). <https://doi.org/10.1101/2020.04.08.20058297>

- Malinga, T., Wiysonge, C.S., Ndwandwe, D., Okeibunor, J.C., Talisuna, A.O.: A scoping review of the impact of long-distance truck drivers on the spread of COVID-19 infection. *Pan Afr. Med. J.* (2021). <https://doi.org/10.11604/pamj.2021.38.27.26691>
- Narciso, F.V., Mello, M.T.: Safety and health of professional drivers who drive on Brazilian highways. *Revista Saúde Pública* (2017). <https://doi.org/10.1590/S1518-8787.2017051006761>
- Nazari, S.S.H., Moradi, A., Rahmani, K.: A systematic review of the effect of various interventions on reducing fatigue and sleepiness while driving. *Chin. J. Traumatol.* (2017). <https://doi.org/10.1016/j.cjtee.2017.03.005>
- Oliveira, M.E.T., Carlotto, M.S.: Factors Associated with Common Mental Disorders in Truck Drivers. *Teoria e Pesquisa, Psicologia* (2020). <https://doi.org/10.1590/0102.3772e3653>
- Saenz, M.J., Koufteros, X.: Special issue on literature reviews in supply chain management and logistics. *Int. J. Phys. Distrib. Logist. Manag.* (2015). <https://doi.org/10.1108/IJPDLM-12-2014-0305>
- Santos, K.O.B., Fernandes, R.C.P., Almeida, M.M.C., Miranda, S.S., Mise, Y.F., Lima, M.A.G.: Labor, health and vulnerability in the COVID-19 pandemic. *Cadernos de Saúde Pública* (2020). <https://doi.org/10.1590/0102-311x00178320>
- Silva, L.G., Luz, A.A., Vasconcelos, S.P., Marqueze, E.C., Moreno, C.R.C.: Vínculos empregatícios, condições de trabalho e saúde entre motoristas de caminhão. *Organizações e Trabalho, Revista Psicologia* (2016). <https://doi.org/10.17652/rpot/2016.2.675>
- Sinagawa, D.M., Carvalho, H.B., Andreuccetti, G., Prado, N.V., Oliveira, K.C.B.G., Yonamine, M., Muñoz, D.R., Gjerde, H., Leyton, V.: Association Between Travel Length and Drug Use Among Brazilian Truck Drivers. *Traffic Injury Prevention* (2014). <https://doi.org/10.1080/15389588.2014.906589>
- Soni, G., Kodali, R.: A critical analysis of supply chain management content in empirical research. *Bus. Process Manag. J.* (2011). <https://doi.org/10.1108/14637151111122338>
- Wanke, P.F.: Fatores de satisfação com o uso de autônomos no transporte rodoviário de cargas. *Produção* (2012). <https://doi.org/10.1590/S0103-65132012005000046>
- Wolff, M.G.C., Caldas, M.A.F.: A model for the evaluation of brazilian road transport: a sustainable perspective. *J. Adv. Transp.* (2018). <https://doi.org/10.1155/2018/5274789>

R. Soliani Federal Institute of Acre (IFAC), Doctor in Environmental Technology (2020), University of Ribeirão Preto (UNAERP), Brazil

L. Bueno Federal University of Paraíba (UFPB), Doctor in Production Engineering (2001), Federal University of Santa Catarina (UFSC), Brazil